BDNF val66met polymorphism influences motor system function in the human brain

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Résumé en anglais	Brain-derived neurotrophic factor (BDNF) is important to brain functions such as plasticity and repair. A single nucleotide polymorphism for this growth factor, val(66)met, is common and associated with decreased activity-dependent BDNF release. The current study evaluated the effects of this polymorphism in relation to human brain motor system function, short-term plasticity, and learning. Functional magnetic resonance imaging (fMRI) scanning during right index finger movement (n = 24) identified activation in a broad sensorimotor network. However, subjects with the polymorphism showed smaller activation volume within several brain regions as compared with subjects without the polymorphism. Repeat fMRI after 25 min of right index finger training found that the 2 genotype groups modulated brain activation differently. In several brain regions, subjects with the polymorphism showed greater activation volume reduction, whereas subjects without the polymorphism showed greater activation volume expansion. On a driving-based motor learning task (independent cohort, n = 29), subjects with the polymorphism showed greater error during short-term learning and poorer retention over 4 days, relative to subjects without the polymorphism. The presence of this BDNF polymorphism is associated with differences in brain motor system function, altered short-term plasticity, and greater error in short-term motor learning. The broader implications of these findings are considered.
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